When HAI Model 5.0a is run for the companies included in the survey, it calculates an average drop length of 52 feet,[3] understating the nationwide BOC drop wire investment by over $1.8 billion. The average drop length in the 1993 New Hampshire Incremental Cost Study, which the HAI modelers heavily rely upon for the Model's switch maintenance assumptions, was 125 feet.[4] When run for New England Telephone, New Hampshire, HAI Model 5.0a produces an average drop length of only 79 feet,[5] understating the New Hampshire drop investment by nearly $19 million. These understated drop wire investments only reflect the drop wire length assumption. If other incorrect HAI Model assumptions are changed, the drop wire investments could be understated even more than the numbers shown here.

Another problem with the drop length in the HAI Model has to do with its lot size and pole spacing assumptions. For example, the average lot size in Oregon for GTE Northwest in the HAI Model contains 72 acres and over 1,000 feet of frontage. The HAI Model, which assumes that houses are in the middle and at the front of the lot, serves

[3] In previous filings made by GTE with the Commission regarding the HAI Model, this figure was shown as 64 feet. Subsequent analysis has shown that the HAI Model does not provide any drops at all associated with aerial distribution cable in the highest two density zones. This yields an average drop length of 52 feet rather than 64 feet.

[4] 1993 New England Telephone, New Hampshire Incremental Cost Study, Attachment 4 at 27.

[5] In previous filings made by GTE with the Commission regarding the HAI Model, this figure was shown as 87 feet. Subsequent analysis has shown that the HAI Model does not provide any drops at all associated with aerial distribution cable in the highest two density zones. This yields an average drop length of 79 feet rather than 87 feet.

customers from a pole at the intersection of the lot line. Clearly, a 150 foot drop served from a pole at the lot line of a house with a 1,000 foot frontage will not reach the house. If the house is going to be served by a pole at the lot line, then the house would require a drop length in excess of 500 feet, over 350 feet more than the maximum drop length found in the HAI Model. Of course it is not logical to serve a house with over 1,000 feet of frontage from the lot line. Instead, this house should be served from a pole closer to the house (poles in the HAI Model are spaced 250 feet apart in the lowest density zone). However, the HAI Model cannot take this logical approach because it does not include sufficient terminal investment to serve customers other than from the lot line. Because the HAI Model assumes four customers per terminal, it would necessitate doubling the terminal equipment investment.

In addition to the items discussed in Exhibit 3, the basic HAI Model 5.0a assumptions behind the time estimates that were arbitrarily assigned to drop placement activities are flawed. Except in new housing developments, drops are typically not placed to living units until a telephone or cable company has received an order for service at that living unit. HAI Model 5.0a claims economies of scale by unrealistically assuming that drops are placed by low-cost, dedicated crews that invade entire neighborhoods, placing drops to every living unit. This was brought about with the release of HAI Model 4.0 when the engineering team reduced these time estimates by nearly 75 percent for some density zones.

Conversely, BCPM correctly calculates the drop lengths necessary to serve customers with a cap at 500 feet in length. BCPM calculates lot sizes by distributing customers along the actual road miles in the grid being modeled, and then calculates the drop length necessary to reach the house once it is placed along the road. This approach is more reasonable because it results in more accurate identification of customer locations and realistic lot sizes. Since one of the prime determinants of drop lengths is lot size, it is not reasonable to apply a fixed drop length as the HAI Model does. Even more egregious is the fact that the HAI developers base these predetermined drop lengths on expert opinion while at the same time ignoring their own empirical data.

The Commission should also address the input parameters associated with cable structure costs including both poles and manholes.[6] A comparison of pole investments from the HAI 5.0a and BCPM 3.1 models yields costs of $417 and $781, respectively. Here again, the HAI Model's bundled costs are 46 percent less than those in BCPM, yet they purportedly include the entire cost of poles, including anchors and guys. A direct comparison of other structure costs is even more difficult since BCPM, in compliance with FCC recommendations, breaks out structure costs separately by terrain type. The HAI Model multiplies its structure placement cost estimates by a "terrain factor" that is based upon expert opinion and does not comport with the empirical cost estimates that were requested and received by the HAI engineering

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[6] *See* Exhibit 3 for a more detailed discussion of the support material used by the HAI Model Developers to determine the default values in the HAI Model for pole investment and manhole investment.

team. In fact, this expert opinion is impeached by the empirical source data that is discussed in more detail in Exhibit 3.

The HAI Model also does not properly count the Special Access DS-1 and DS-3 lines. These DS-1 and DS-3 equivalent DS-0s are incorrectly included in the total lines for purposes of dividing the Outside Plant Loop Costs to determine the unit cost per loop. In a recent Order, the Washington Utilities and Transportation Commission noted that the HAI Model's treatment of Special Access DS-1 and DS-3 lines in terms of voice channel equivalents results in an understatement in the unit cost of providing a loop. The Commission further concluded that while only US WEST submitted data supporting its contention, it recognized the potential that similar data from GTE may impact the loop cost.[7]

In its "Request of GTE for Clarification" filed in Washington on May 6, 1998, GTE Northwest calculated the effect of the HAI Model's treatment of DS-1 and DS-3 Special Access lines on loop cost. The Model's understatement of GTE Northwest's loop cost in Washington resulting from this methodology is estimated be $1.00 per line. This estimate was developed using the following methodology:

- In 1996 GTE Northwest in Washington had 2648 DS-1s and 62 DS-3s. Multiplying these values by 24 and 672 respectively yields a DS-1/DS-3 equivalent of 105,216 circuits. The sum of the DS-1 and DS-3 circuits was subtracted from this result to account for them as physical line equivalents, yielding a DS-1/DS-3 equivalent figure of 102,506. This

[7] Eighth Supplemental Order - Interim Order Establishing Costs for Determining Prices in Phase II, Washington Utilities Transportation Commission, Docket Nos. UT-960369, et al., ¶¶ 200-205 (Apr. 16, 1998).

figure is 52.17 percent of GTE's 1996 ARMIS business line count of 196,469.

- The HAI Model 3.1's 1995 GTE Northwest business line count in Washington of 182,140 was reduced by the same factor (52.17 percent) to 87,118. This results in a reduction in total line count from 766,423 to 671,401. The effect of these changes on a HAI Model 3.1 "base run" is a $ 7,750,951 decrease in the loop cost and a $1.00 increase in the per line loop cost from $13.85 to $14.85.

While the specific dollar amount will vary from state to state, depending on the relative number of DS-1s and DS-3s compared to the number of voice grade circuits, the methodology used in the HAI Model will always understate the unit cost per loop.